

REMARKS/RECONSIDERATION

Reconsideration is respectfully requested of the Official Action of October 1, 2007, relating to the above-identified application.

A request for a three month extension of time, together with the associated fee, is filed herewith.

The claims in the application are Claims 1-7 and 10-13.

The rejections of former Claim 9 under 35 U.S.C. § 112 (second paragraph) and under 35 U.S.C. § 101 are rendered moot by the cancellation of Claim 9.

All claims have been revised and amended to define the method for the production of a membrane electrode unit for direct methanol fuel cells. Original Claim 7 was also directed to the method for the production of a membrane electrode unit for direct methanol fuel cells and was examined and, therefore, it is submitted that all claims in the application are properly amended to define the method instead of the product membrane electrode unit *per se* and are now subject to examination.

The rejections of Claims 1 and 2 under 35 U.S.C. § 102(b) as anticipated by *Kosek, et al.*, U.S. 5,523,177, or *Acker*, U.S. 2002/0102451, are traversed and reconsideration is respectfully requested.

Claims 1 and 2 now define a method for the production of a membrane electrode unit for direct methanol fuel cells comprising an anode gas diffusion substrate, an anode catalyst layer, an ionomer membrane, a cathode catalyst layer and a cathode gas diffusion substrate. The anode catalyst layer is applied to the anode gas diffusion substrate and the cathode catalyst layer is applied directly to the ionomer membrane. After that, the various layers are assembled with the

cathode gas diffusion substrate. This is explained in the application beginning at line 34 on page 6.

In contrast to the present invention, *Kosek* describes membrane electrode units manufactured by applying the anode structure either on the gas diffusion substrate which could be a substance such as carbon paper, or directly to the membrane; see column 5, lines 27 to 30. The cathode catalyst is applied to the gas diffusion substrate and not to the ionomer membrane as specified in Claim 1 of the present application.

In *Kosek's* invention, the multiple electrodes are then bonded together with the membrane as explained in column 5, lines 34 to 50 and example 1. Thus, *Kosek* does not utilize the same sequential steps in the method of production of an MEU for the direct methanol fuel cells. Applicants herein have explained that as a result of the different process steps involved in applicant's invention whereby the cathode catalyst layer is applied directly to the ionomer membrane (instead of first to the gas diffusion substrate) makes it possible to achieve advantages because all the catalyst layers can be produced independently of each other and can be tailor-made according to the desired specifications. Since applicants' process steps are not shown in *Kosek*, this reference does not anticipate Claims 1 and 2.

The *Acker* patent does not describe where the catalyst layers have to be applied and, hence, provides no teaching of applicants' structure. See paragraph [0051] and [0053] of the *Acker* patent. Applicants invite attention to the present application where surprising results are described as being obtained when following the claim's sequential process. Reference is made to page 5, lines 14 to 20, and page 6, lines 9 to 19, where a certain selection of processing steps

is made. Accordingly, applicants respectfully submit that neither *Kosek* nor *Acker* describe the invention within the meaning of 35 U.S.C. § 102(b).

The rejection of Claim 3 under 35 U.S.C. § 103(a) is unpatentable over *Acker*, *et al.* further in view of *Miyamoto*, U.S. Pub. 2004/0185414 is traversed and reconsideration is respectfully requested.

The *Acker* patent has already been discussed above and the comments made apply here as well.

The Official Action relies on *Miyamoto* to disclose a thickness of the anode cathode catalyst layer in the range of 40 to 150 microns. The Official Action concludes that at the time of the invention it would have been obvious to a person having ordinary skill in the art to apply catalyst layers with a thickness consistent with the teachings of *Miyamoto*.

However, as already pointed out above, *Acker* does not disclose the sequential steps recited in Claim 1 upon which Claim 3 is dependent and, therefore, the *Acker* reference fails to describe the important features of the present invention. These missing elements are not found in *Miyamoto*. Hence, applicants respectfully submit that the combination of *Acker* and *Miyamoto* does not create *prima facie* obviousness for the claimed invention. Accordingly, applicants request that the rejection be withdrawn.

The rejection of Claims 4, 5 and 6 under 35 U.S.C. § 103(a) in view of the *Kosek* patent taken with the article of *Joerissen* and the patent of *Surampudi*, U.S. 5,599,638, is traversed and reconsideration is respectfully requested. It has already been mentioned that *Kosek* discloses a different sequence of the process steps which are now excluded by the language of Claim 1 (on which the rejected claims depend). *Joerissen* discloses a method for the production of MEU by

coating catalyst inks on both sides of a heated membrane by an airbrush. This is shown in Chapter 2.3.

Surampudi discloses a method for producing an anode layer by electrode depositing platinum-ruthenium on a carbon electrode; see column 14, lines 31 to 59.

Since the rejected claims depend on Claim 1, they include all of the method steps of Claim 1. Consequently, since none of the references show the method steps recited in Claim 1, applicants respectfully submit that the combination of references fails to create obviousness under 35 U.S.C. § 103 for the subject matter of Claims 4, 5 and 6. Accordingly, applicants respectfully request that the rejection be withdrawn.

The rejection of Claim 7 under 35 U.S.C. § 103(a) as unpatentable over *Kosek* taken with the *Wilson* patent, U.S. 5,234,777, is traversed and reconsideration is respectfully requested.

Applicants have already pointed out that *Kosek* does not disclose the MEU process of the present invention because it fails to show the step of depositing the cathode catalyst layer directly to the ionomer membrane instead of first depositing it to a gas diffusion substrate. Hence, this important and critical step is missing from the combination of references and would not be readily arrived at from a consideration of what is taught in references. There is no suggestion that there would be any benefit derived from changing the sequence of process steps in making the MEUs and, therefore, applicants respectfully submit that the references fail to create *prima facie* obviousness under 35 U.S.C. § 103(a). Consequently, applicants respectfully request that the rejection be withdrawn.

The remarks made above with respect to all of the references apply with equal emphasis to new Claims 10 through 13. It should be noted that new Claims 11 and 12 are based on former Claim 9.

For similar reasons, applicants submit that the references fail to anticipate or render obvious the subject matter of this application and, therefore, request allowance at the Examiner's earliest convenience.

Respectfully submitted,

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